A New Communication Tool:
Time Dependent Multimedia Document

Takeshi Yoneda, Joung-Hoon Lim, Tatsuo Sato and Yutaka Matsushita

Faculty of Science and Technology,
Keio University

P90 -97

ABSTRACT

As a tool which supports human communication effectively under distributed computing environments, TDMD(Time Dependent Multimedia Document) is developed. TDMD can include various types of media such as audio, video, text, graphics and image. Information of these media can be presented synchronously. TDMD can also include buttons which are used for a viewer to control the sequence of the presentation of TDMD. Multimedia presentation is formally defined and according to the definition, TDMD is structured as a tree. In the structure, temporal information, layout information and content information is successfully included. An authoring system was implemented in which TDMDs are easily created and presented.

1. INTRODUCTION

Because of tremendous progress in computer technology, various types of media such as audio, video, image, graphics and text can be handled by computers. These multimedia information can be transmitted through integrated service LANs, e.g.,[1][2]. There is a need for developing a new communication tool which will replace current electronic mails including only text. So, we develop TDMD(Time Dependent Multimedia Document) including multimedia information as a new tool which supports human communication effectively under distributed computing environments.

There are some international standards for multimedia documents such as ODA(Office Document Architecture)[3][4], SGML(Standard Generalized Markup Language)[5]-[7] and HyTime[8] . A document specified in ODA can include text, graphics and image. The receiver of the document can view the document presentation as intended by the sender. But a document specified in ODA cannot include audio and video, while SGML is a language

for describing the logical structure of a document. So it is not appropriate for specifying layout structures.

HyTime is a hypermedia document structuring language which is an application of SGML. By means of HyTime, most of hypermedia and time dependent documents can be structured but heavy software components such as a HyTime engine and a SGML parser are needed for such documents described by HyTime to be presented.

There have been some studies about the structure of a multimedia mail and a multimedia document.[9]-[14] In them, documents are structured from the view point of the temporal relationships among media.

In [9]-[11], a multimedia document is structured as a binary tree by considering two temporal relationships ("sequential ", "simultaneous") between a pair of content elements. In [12][13], the delay between simultaneous presentation and sequential presentation of two media was taken into account, and thirteen basic temporal relationships between two media were provided. By using these temporal relationships, multimedia information is structured as a tree. In both cases, the hight of their tree structures is not fixed and the more the number of content elements included in a document increases, the more difficult it is to determine the best structure from among possible created structures.

In[14], the structure of TDMD was proposed in which temporal information(when information of each media should be displayed or played back), layout information(where information of each media should be displayed or played back) and content information(what information of each media is) is successfully included but input from a user could not be specified.

In this paper, multimedia presentation is formally defined and it is shown that, according to the definition, TDMD can be represented uniquely as a tree structure. In the structure, hyperlink information can be included by introducing buttons which is uniformly treated as other media. The content information included in a button is its appearance image as a metaphor and the name of a destination node, from which successive presentation